HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Cedar River Sockeye Program
Species or Hatchery Stock:	Sockeye (*Onchorynchus nerka*) Cedar River
Agency/Operator:	Washington Department of Fish and Wildlife
Watershed and Region:	Cedar River (Lake Washington) Puget Sound
Date Submitted:	March 17, 2003
Date Last Updated:	December 11, 2002

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Cedar River Sockeye Program

1.2) Species and population (or stock) under propagation, and ESA status.

Cedar River Sockeye (*Onchorynchus nerka*) - not listed

1.3) Responsible organization and individuals

Name (and title):	Chuck Phillips, Region 4 Fish Program Manager Brody Antipa, Complex Manager	
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

The Muckleshoot Indian Tribe has co-management authority for the Lake Washington system.

1.4) Funding source, staffing level, and annual hatchery program operational costs.

The City of Seattle funds the project, with an annual budget of $272,000, with cost of living increase adjustments. The project has up to 12 temporary employees and 1 permanent employee associated with it.

1.5) Location(s) of hatchery and associated facilities.

Cedar River Hatchery:	Located on the Cedar River (08.0299) at RM 21.7. The broodstock collection weir is located at RM 6.4.

1.6) Type of program.

Integrated harvest

1.7) Purpose (Goal) of program.

The purpose of the sockeye hatchery program in the Cedar River is to increase the number of fry entering Lake Washington. The goal is to ultimately have increased numbers of returning sockeye adults on an annual basis.

1.8) Justification for the program.

Any harvest opportunity for sockeye in Lake Washington by recreational anglers will require the release of chinook. Tribal net fisheries will be relatively short in duration and early in the chinook timing to minimize chinook encounters. Both fisheries will be monitored to assure that takes are within acceptable limits.

1.9) List of program "Performance Standards".

See section 1.10.

1.10) List of program "Performance Indicators", designated by "benefits" and "risks."

Performance Standards and Indicators for Puget Sound **Integrated Harvest** sockeye programs.

Performance Standard	Performance Indicator	Monitoring and Evaluation Plan
Produce adult fish for harvest	Survival and contribution rates	Monitor catch and measure survivals by periodical CWT data. (if available)
Meet hatchery production goals	Number of juvenile fish released - **16,000,000**	Estimating number of fish planted (weighing / counting fish), monitoring proximity to hatchery production goals, number released recorded on hatchery divisions "plant reports", data available on WDFW data base. Future Brood Documents.

Manage for adequate escapement	Hatchery and wild return rates Catch rates	Monitoring hatchery/wild return rates through trapping (at the hatchery or at weir), live fish counts in index areas on the spawning grounds plus catch records.
Minimize interactions with listed fish through proper broodstock management	Total number of broodstock collected - **12,000**	Measuring number of fish actually spawned and killed to meet egg take goal at the hatchery. Hatchery Records.
	Sex ratios	Hatchery Records, Spawning guidelines
	Timing of adult collection/spawning - **September thru November**	Start trapping prior to historical start of the run, continue trapping throughout the run, dates and times are recorded on hatchery divisions "adult reports", data available on WDFW data base.
	Number of listed fish passed upstream - **all listed fish (chinook) are passed**	
	Hatchery stray rate	CWT data and spawning ground surveys
	Number wild fish used in broodstock - **Unknown**	Hatchery records
	Return timing of hatchery / wild adults - **late June thru August**	Hatchery records
	Adherence to spawning guidelines - **see section 8.3**	Spawning guidelines

Minimize interactions with listed fish through proper rearing and release strategies	Juveniles released as smolts	Future Brood Document (FBD) and hatchery records
	Outmigration timing of listed fish / hatchery fish - **/April-May**	Hatchery records and historical natural out-migrant data
	Size and time of release - **2,000 fpp/January - April**	FBD and hatchery records CWT data and mark / unmarked ratios of adults
	Hatchery stray rates	
Maintain stock integrity and genetic diversity	Effective population size	Spawning guidelines
	Hatchery-Origin Recruit spawners	Spawning ground surveys
Maximize in-hatchery survival of broodstock and their progeny; and Limit the impact of pathogens associated with hatchery stocks, on listed fish	Fish pathologists will monitor the health of hatchery stocks on a monthly basis and recommend preventative actions / strategies to maintain fish health	Co-Managers Disease Policy Fish Health monitoring records
	Fish pathologists will diagnose fish health problems and minimize their impact	
	Vaccines will be administered when appropriate to protect fish health	

	A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings	
	Fish health staff will present workshops on fish health issues to provide continuing education to hatchery staff.	
Ensure hatchery operations comply with state and federal water quality standards through proper environmental monitoring	NPDES compliance	Monthly NPDES records

1.11) Expected size of program.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

6000 females and 6000 males.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location.

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry	Cedar River (08.0299)	16,000,000
Fry		
Fingerling		
Yearling		

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

The escapement levels just back to the Cedar River between 1995 and 2000 have been 22,000, 230,000, 104,000, 49,588, 22,138 and 148,225, respectively.

1.13) Date program started (years in operation), or is expected to start.

1991

1.14) Expected duration of program.

Ongoing

1.15) Watersheds targeted by program.

Lake Washington watershed (08)
-Cedar River (08.0299)

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

2.1) List all ESA permits or authorizations in hand for the hatchery program.

None

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

2.2.1) Description of ESA-listed salmonid population(s) affected by the program.

- Identify the ESA-listed population(s) that will be directly affected by the program.

None

- Identify the ESA-listed population(s) that may be incidentally affected by the program.

Issaquah (Lake Washington) Summer/Fall Chinook

Most naturally-spawned Lake Washington chinook migrate to salt water after spending only a few months in freshwater. Arrival of both hatchery and naturally-produced smolts in the estuary peaks in late May, and after a few weeks, most begin moving to near-shore feeding grounds in Puget Sound and the Pacific Ocean. Sexually mature fish begin arriving back at the Ballard Locks as early as June. The peak counts at the Chittenden Locks is usually in early to mid-August.

N. Lake Washington Tribs Summer/Fall Chinook, Cedar River Summer/Fall Chinook

There are naturally spawning adult chinook in tributaries throughout the Lake Washington basin, however, their genetic origin is uncertain. There are genetically distinct chinook in the Cedar River. Adults spawn in the mainstem Cedar River from about river mile 1.0 in Renton to the City of Seattle water pipeline crossing at river mile 21.3. In 1999, 81% of the chinook redds were observed above river mile 6.5 and the first redd observed was on August 18. Spawning activity peaks in early October and is generally complete by early to mid-November. Big Bear/Cottage, Issaquah, and Kelsey Creeks also have significant numbers of spawners. Recent genetic testing (1999 broodyear) of Bear Creek chinook indicate that they are very similar to the Issaquah Hatchery stock.

2.2.2) Status of ESA-listed salmonid population(s) affected by the program.

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds.

Critical and viable population thresholds under ESA have not been determined, however, the SASSI report (WDFW) determined this population (Issaquah (Lake Washington) Summer/ Fall Chinook) status to be "healthy" while the N. Lake Washington Tribs and Cedar River Summer/Fall Chinook are "unknown".

- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

The table below provides the Lake Washington chinook broodyear live count Area Under the Curve index spawning escapement, subsequent reconstructed run size and return per spawner. This information is for natural spawners in Bear/Cottage and the Cedar River mainstem. The source of these data are from WDFW run reconstruction tables.

Return Year	Run Size	Brood Year Index Escapement	Return/ Spawner
1988	2,769	1,252	2.2117
1989	1,832	949	1.9305
1990	1,214	1,470	0.8259
1991	1,517	2,038	0.7444
1992	1,407	792	1.7765
1993	321	1,011	0.3175
1994	924	787	1.1741
1995	969	661	1.4660
1996	345	790	0.4367
1997	305	245	1.2449
1998	700	888	0.7883

1999	780	930	0.8387
2000		336	
2001		294	

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.

Live count Area Under the Curve index spawning escapement estimates for the Cedar River mainstem, Bear Creek and Cottage Lake creeks. There is no expansion to un-surveyed sections or for fish not seen (WDFW data).

Return Year	Cedar	Cottage	Bear	System Total
1983	788	403	141	1332
1984	898	264	90	1252
1985	766	124	59	949
1986	942	386	142	1470
1987	1540	226	272	2038
1988	559	50	183	792
1989	558	208	245	1011
1990	469	161	157	787
1991	508	93	60	661
1992	525	75	190	790
1993	156	44	45	245
1994	452	186	250	888
1995	681	143	106	930
1996	303	11	22	336
1997	227	42	25	294
1998	432	192	73	697
1999	241	258	279	778
2000	120	97	130	347

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

There are no estimates of direct hatchery-origin chinook on the spawning grounds. There are no recent coded-wire tag releases in the Lake Washington system, therefore, there are no adipose-fin clipped released chinook. The 2000 releases were mass marked (adipose-fin clip only) so the hatchery percentages may be available in the future. It is assumed that a high percentage of natural spawners in Issaquah Creek are of hatchery origin.

2.2.3) <u>Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take</u>.

- Describe hatchery activities that may lead to the take of listed salmonid

populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Broodstock collection directed at sockeye salmon has a potential to take listed chinook salmon, through migrational delay, capture, handling, and upstream release, during trap operation on the Cedar River. Protocols are in effect to minimize potential impacts to chinook. The weir will only be operated when sockeye broodstock must be collected; otherwise, the weir is left open to allow passage of chinook salmon. During the 3-4 days of weir operation per week, operational protocols require checking the trap 2-3 times per day. If chinook salmon are observed aggregating below the weir, it will be opened to promote upstream passage of returning adults. The weir is managed so that upstream migrational delay to chinook is no greater than 24 hours.

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.

Unknown. No direct mortality of chinook has been observed at the collection weir.

- Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).

See "take" table

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

NA

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

The project is a component of the City of Seattle Habitat Conservation Plan for the Cedar River Watershed. It is overseen by the Cedar River Anadromous Fish Committee.

3.3) Relationship to harvest objectives.

3.3.1) Describe fisheries benefitting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

There were recreational and tribal fisheries in Lake Washington for sockeye in 1996 and 2000, however, the harvest of hatchery sockeye for those years is not available at this time. There is some overlap between program-origin sockeye and listed chinook. Fishing openings will be scheduled in July and early August well before chinook numbers in the lake peak. By having early fisheries, incidental chinook encounters will be minimized.

3.4) Relationship to habitat protection and recovery strategies.

One of the major factors affecting the natural production of sockeye in the system appears to be losses from gravel movement during high flows. Much of the main stem Cedar River is channelized, providing little protection for incubating eggs during high winter flows. Information collected by monitoring fry production in the Cedar indicate a strong inverse relationship between peak winter flows above a minimum threshold and egg to fry survival. There are also significant losses during fry out-migration due to predation.

Other possible factors affecting natural production is zooplankton production, in-lake predation, and losses at the Chittenden Locks at Ballard during smolt out-migration.

Improvements have been made at the Ballard Locks to reduce injury rates . Two spill gates in the dam have been fitted with smolt passage flumes. These offer safe passage for smolts. By slowing the fill of the large locks fewer smolts seem to be entrained in the first place.

3.5) Ecological interactions.

The Species Interaction Workgroup (SIWG) (1984) identified sockeye as posing a low risk of competition and predation to naturally produced chinook in freshwater.

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

The water source for the incubation facility is derived from a series of 4 surface springs that are both pumped and gravity fed into a tower where water is distributed to incubators. Total water usage at the incubation area is approximately 700 gallons per

minute (gpm). Chillers are used to otolith mark all fry at the facility. The water source at the adult ponds is derived from four surface springs and is both gravity and pumped. Total use at the 4 adult holding ponds is approximately 1200 gpm during peak usage.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

Any water withdrawals for hatchery use occur through screen buckets with 1/16" intake holes. Water is withdrawn with portable trash pumps during daylight hours only to fill fry and adult hauling trucks and for fry acclimation ponds.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Adults are collected with a rack and picket weir (located at RM 6.4) with V entrances containing two 8' X 10' collection boxes. Fish are netted and sorted by hand inside the cages. The weir contains removable picket sections that are lifted to pass all species of fish when sockeye collection is not necessary. In the initial years of the hatchery program gillnets were used to capture broodstock. This method is no longer used if adult chinook are present in the river system.

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

Fish are hauled in two different 300 gallon tank trucks equipped with oxygen and air stones.

5.3) Broodstock holding and spawning facilities.

Broodstock are held in 4 different 13' diameter circular ponds fed with spring water. Adults are spawned pondside at the adult holding area.

5.4) Incubation facilities.

Incubation facilities consist of 20 half stack vertical incubators and 53 Kitoi box upwelling incubators.

5.5) Rearing facilities.

To date, rearing has only occurred on a small, experimental basis and has not yet been incorporated into permanent production.

5.6) Acclimation/release facilities.

Fry are acclimated in four 6' diameter circular holding ponds. Fry are released into 3 separate sites on the Cedar River; directly from the ponds at the hatchery, and from sites in the lower river at RM 2.3 and RM .5. The lower river releases are hauled via 300 gallon tank truck and released directly into the river. All sockeye fry are released one hour after official posted sunset time to mimic the out-migration timing of naturally produced fry.

5.7) Describe operational difficulties or disasters that led to significant fish mortality.

Chilling events occur up to 10 times on each incubator; human error has caused fish mortality in incubators when water flows were not properly adjusted.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source.

Sockeye returning to the Cedar River trap.

6.2) Supporting information.

6.2.1) History.

Sockeye were introduced into Lake Washington from various sources at different times. In 1935, 96,000 fingerlings from Baker Lake were introduced. Cultus Lake sockeye were introduced in 1944, 1950, and 1954.

6.2.2) Annual size.

The goal is 6000 females and 6000 males. The annual run size just to the Cedar River can range from 24,000 to 300,000.

6.2.3) Past and proposed level of natural fish in broodstock.

100% in the past and will consist of all returnees in the future regardless of origin. Hatchery produced adults are indistinguishable from naturally produced fish.

6.2.4) Genetic or ecological differences.

None

6.2.5) Reasons for choosing.

The Cedar River sockeye is the strongest run of sockeye in the lower 48 states. The stock maintains a long entry and spawn timing in the Cedar River.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

NA

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Adults

7.2) Collection or sampling design.

Adults are collected with a rack and picket weir which contains two 8' X 10' collection boxes. The weir is typically installed after Labor Day in September and is typically in operation until Thanksgiving. Every effort is made to capture a full representation of the run timing as environmental conditions allow. In years where the weir is lost to floods or high water, the later run timing fish are not well represented in the broodstock collection. Gillnets have been used in the past to capture some of the later returning fish after the weir is lost.

7.3) Identity.

Otolith marks are the only way to differentiate between hatchery and wild fish. This is not a visible mark, so the two cannot be differentiated at the time of collection.

7.4) Proposed number to be collected:

7.4.1) Program goal (assuming 1:1 sex ratio for adults):

6,000 females, 6000 males.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Year	Adults			Eggs	Juveniles
	Females	Males	Jacks		
1988					
1989					
1990					
1991					
1992					
1993					
1994					
1995	1,773	1,550		5,319,000	
1996	4,752	4,441		14,718,000	
1997	3,359	2,432		10,736,000	
1998	3,296	2,507		10,520,000	
1999	967	853		3,174,000	
2000	5,370	4,921		17,171,000	
2001	3,789	2,957		12,113,000	

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

All fish, if not used for broodstock, are allowed to pass the collection weir and spawn naturally, regardless of origin.

7.6) Fish transportation and holding methods.

All fish captured at the weir are hauled via tanker truck to holding ponds at Landsburg. The haul takes approximately 20 minutes. No anesthetic is used. Fish are typically held between 2 and 14 days before spawning.

7.7) Describe fish health maintenance and sanitation procedures applied.

Sockeye are carriers of the IHN virus, so strict disinfection and isolation procedures are in effect. All spawning and hauling gear is disinfected with a 100 parts per million (ppm) iodophor solution to control the virus. The spawning and holding area is isolated from the incubation area.

7.8) Disposition of carcasses.

All spawned and unspawned carcasses are returned to the Cedar River for nutrient enhancement.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

Protocols are in effect to minimize potential impacts to chinook. The weir will only be operated when sockeye broodstock must be collected; otherwise, the weir is left open to allow passage of chinook salmon. During the 3-4 days of weir operation per week, operational protocols require checking the trap 2-3 times per day. If chinook salmon are observed aggregating below the weir, it will be opened to promote upstream passage of returning adults.

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1) Selection method.

Spawners are selected randomly at the collection weir to match the natural run entry timing of the population. They are selected on spawning days depending on ripeness.

8.2) Males.

Every female receives a primary male and backup male. Jacks are used when available.

8.3) Fertilization.

All matings are individual 1:1 with a backup male. All fertilization occurs in individual plastic bowls. A teaspoon of water is used as a sperm activator. All eggs are washed, disinfected, and water hardened in an 100 parts per million (ppm) iodophor solution.

8.4) Cryopreserved gametes.

NA

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

NA

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

Egg take has ranged from a low of 2 million to a high of 18.5 million. Green to eyed survival rates are typically over 90%.

9.1.2) Cause for, and disposition of surplus egg takes.

NA

9.1.3) Loading densities applied during incubation.

Eggs are typically 8 eggs per gram. Kitoi incubators are set at 10 gpm and loaded with 250,000 eggs on average. Vertical incubators are set a 4 gpm and loaded at 13,000 eggs per tray.

9.1.4) Incubation conditions.

Incubators are checked daily by hatchery personnel. Temperature at the incubation facility is between 45-48 degrees Fahrenheit. Silt is minimal due to spring water source. The incubators are flushed occasionally to remove any organic buildup. Temperature is monitored daily. Dissolved oxygen is not monitored frequently but is generally saturated.

9.1.5) Ponding.

Fry are ponded at an average KD index factor of 1.82 or at a Temperature Unit (TU) average between 1700 and 1800. Fry typically are around 2800 fish per pound (fpp) with an average length of 29 millimeters (mm) at ponding. Ponding is forced and is typically around 126 days post fertilization.

9.1.6) Fish health maintenance and monitoring.

Fungus is controlled with daily formalin treatments. Egg mortality is removed when eggs are shocked and picked at 700 TU's. All incubators are sampled for the presence of IHN virus.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

NA

9.2) Rearing:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available..

NA

9.2.2) Density and loading criteria (goals and actual levels).

Fry rearing has only been experimental to date, loading level was 1 pound per cubic foot.

9.2.3) Fish rearing conditions

Intermediate fiberglass raceways that are 2' X 2' X 16'.

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

NA

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

NA

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

NA

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

NA

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

NA

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

NA

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

NA

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry	16,000,000	2,000	January-April	Cedar River
Fry				
Fingerling				
Yearling				

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse: Cedar River (08.0299)
Release point: Cedar River (RM 21.7, 2.3, 0.5)
Major watershed: Lake Washington
Basin or Region: Puget Sound

10.3) Actual numbers and sizes of fish released by age class through the program.

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1988								

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1989								
1990								
1991								
1992								
1993								
1994								
1995	7,182,522	3088						
1996	5,592,000	3088						
1997	15,204,000	3088						
1998	9,800,300	2775						
1999	9,627,000	2700						
2000	3,346,000	2600						
2001	17,149,000	2740						
Average	9,700,117	2868						

10.4) Actual dates of release and description of release protocols.

Release date is dependent on stage of development and KD index factor. Fish are forced released from the acclimation ponds or tanker truck. Releases typically occur from the third week in January through the end of April.

10.5) Fish transportation procedures, if applicable.

Fish are hauled to down river release sites via 300 gallon tanker trucks and all fish are released one hour after sunset to mimic natural out-migration timing.

10.6) Acclimation procedures.

Fish are acclimated to Cedar River water for 8-12 hours on the day of release.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

All fry released are otolith marked.

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

NA

10.9) Fish health certification procedures applied pre-release.

All incubators are tested for the presence of IHN virus.

10.10) Emergency release procedures in response to flooding or water system failure.

Highly dependent on the situation and development stage of the eggs/fry.

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

The Species Interaction Workgroup (SIWG) (1984) identified sockeye as posing a low risk of competition and predation to naturally produced chinook in freshwater.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

A comprehensive monitoring and adaptive management plan is under development by the Cedar River Anadromous Fish Committee.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

Funding will be provided through the Cedar River HCP.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Risk aversion measures will be developed in conjunction with the monitoring plan.

SECTION 12. RESEARCH

12.1) Objective or purpose.

Not applicable.

12.2) Cooperating and funding agencies.

12.3) Principle investigator or project supervisor and staff.

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

12.6) Dates or time period in which research activity occurs.

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.

12.8) Expected type and effects of take and potential for injury or mortality.

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).

12.10) Alternative methods to achieve project objectives.

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

SECTION 13. ATTACHMENTS AND CITATIONS

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

Table 1. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Chinook ESU/Population: Puget Sound Activity: Hatchery Operations				
Location of hatchery activity: Cedar River Dates of activity: August-April Hatchery program operator: WDFW				
Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)			Unknown	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)			Unknown	
Other Take (specify) h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

Instructions:

1. An entry for a fish to be taken should be in the take category that describes the greatest impact.
2. Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).
3. If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.